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ASSOCIATION OF FINAL ANTEPARTUM NON-STRESS TEST REACTIVITY WITH MODE OF DELIVERY AND NEONATAL OUTCOMES AMONG HIGH-RISK PREGNANCIES: A PROSPECTIVE OBSERVATIONAL STUDY.

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ABSTRACT **Background:** High-risk pregnancies require appropriate fetal surveillance. This study evaluated the association between the Final NST recorded at the time of delivery and mode of delivery and selected neonatal outcomes in high-risk pregnancies. **Methods:** A 100-record prospective observational master chart was analysed directly. Forty-nine pregnancies had a reactive Final NST, 48 had a non-reactive/non-reassuring Final NST and 3 had missing values. Outcomes included Caesarean delivery, low birth weight (LBW), NICU admission, RDS, MAS, neonatal sepsis, discharge morbidity and neonatal death. Fisher's exact test was used for categorical comparisons. **Results:** Caesarean delivery occurred in 55.1% of reactive and 60.4% of non-reactive pregnancies (p=0.682). LBW occurred in 20.4% versus 41.7% (OR 2.79, 95% CI 1.13–6.86; p=0.029). NICU admission occurred in 20.4% versus 35.4% (p=0.117), RDS in 12.2% versus 16.7% (p=0.576), MAS in 2.0% versus 4.2% (p=0.617), sepsis in 0% versus 4.2% (p=0.242), and discharge morbidity in 36.7% versus 43.8% (p=0.538). All five recorded neonatal deaths occurred in the non-reactive group (10.4%; p=0.027). **Conclusion:** Non-reactive Final NST was significantly associated with LBW but not with Caesarean delivery or most evaluated neonatal outcomes. The mortality finding is clinically important but should be interpreted cautiously because of the small number of events and lack of adjusted analysis.

KEYWORDS : High risk pregnancy, Non stress test, Low birth weight, caesarean delivery, NICU admission.

INTRODUCTION

High-risk pregnancy includes maternal, obstetric, placental and fetal conditions associated with increased perinatal risk. Antepartum fetal surveillance is intended to identify pregnancies in which fetal compromise may develop and to permit timely evaluation and intervention. The non-stress test (NST) is a commonly used, non-invasive component of fetal surveillance.

A reactive NST is generally reassuring, whereas a non-reactive tracing can occur with fetal compromise as well as fetal sleep, prematurity, medication exposure and other non-hypoxic factors. Current guidance emphasizes individualized surveillance and interpretation of abnormal results in the context of maternal status, fetal status and gestational age.

The significance of a Final NST immediately before delivery may differ from that of an earlier surveillance test. A non-reactive result may reflect reduced fetal reserve, but it may also be a marker of the underlying condition prompting delivery. This study therefore assessed whether Final NST reactivity was associated with mode of delivery and selected neonatal outcomes in a high-risk cohort.

MATERIALS AND METHODS

This was a prospective observational analysis of a 100-record master chart from BKL Walawalkar Rural Medical College and Hospital, Dervan, Ratnagiri, Maharashtra.

The primary exposure was the value recorded under "NON STRESS TEST – at the time of delivery." Reactive entries were classified as Reactive. Non-reactive, non-reassuring, non-assuring and equivalent spelling variants were standardized as Non-reactive. Three blank records were retained as missing. Comparative analyses therefore included 49 reactive and 48 non-reactive pregnancies.

Mode of delivery was classified as Caesarean/LSCS versus non-LSCS. LBW was defined as birth weight <2.5 kg. Birth weights were standardized to kilograms, including conversion of 945 gm to 0.945 kg. NICU admission was taken from the recorded yes/no field. RDS, MAS, sepsis, discharge morbidity and neonatal death were identified from the recorded fetal-outcome/discharge fields.

A five-minute Apgar variable was not consistently available and was not analysed.

Continuous variables were summarized using mean and standard deviation. Categorical comparisons used Fisher's exact test because of small cell counts. Odds ratios and exact 95% confidence intervals were calculated where estimable. Statistical significance was defined as $p<0.05$.

RESULTS

The cohort comprised 100 pregnancies. Mean maternal age was 28.88 ± 5.01 years. Gestational age was numerically parsable in 65 records, with a mean of 38.13 ± 1.45 weeks. Mean standardized birth weight was 2.63 ± 0.58 kg.

Final NST was reactive in 49 (49.0%), non-reactive in 48 (48.0%) and missing in 3 (3.0%). Common recorded high-risk conditions included previous LSCS, gestational diabetes mellitus, hypertensive disorders, Rh-negative pregnancy, thyroid disorders, postdated pregnancy, anaemia and malpresentation; categories were not mutually exclusive.

Caesarean delivery occurred in 27/49 (55.1%) reactive and 29/48 (60.4%) non-reactive pregnancies (OR 1.24, 95% CI 0.55–2.79; p=0. 682).

LBW occurred in 10/49 (20.4%) reactive and 20/48 (41.7%) non-reactive pregnancies (OR 2.79, 95% CI 1.13–6.86; p=0.029). NICU admission was 20.4% versus 35.4% (p=0.117); RDS 12.2% versus 16.7% (p=0.576); MAS 2.0% versus 4.2% (p=0.617); sepsis 0% versus 4.2% (p=0.242); and discharge morbidity 36.7% versus 43.8% (p=0.538). All five neonatal deaths occurred in the non-reactive group (5/48, 10.4%; p=0.027).

Table 1. Principal Outcomes According to Final Nst Reactivity

Outcome	Reactive n=49	Non-reactive n=48	p value
Caesarean	27 (55.1%)	29 (60.4%)	0.682
LBW	10 (20.4%)	20 (41.7%)	0.029
NICU	10 (20.4%)	17 (35.4%)	0.117
RDS	6 (12.2%)	8 (16.7%)	0.576
MAS	1 (2.0%)	2 (4.2%)	0.617
Sepsis	0 (0%)	2 (4.2%)	0.242
Discharge morbidity	18 (36.7%)	21 (43.8%)	0.538
Neonatal death	0 (0%)	5 (10.4%)	0.027

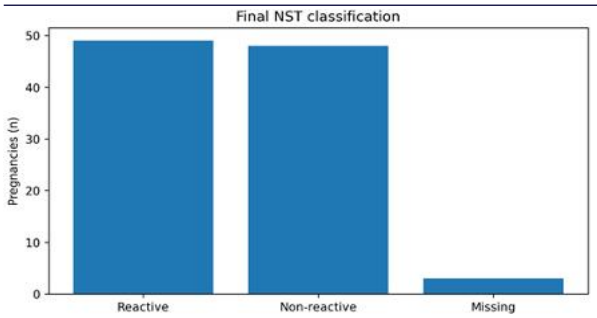

Figure 1. Final Nst Classification.

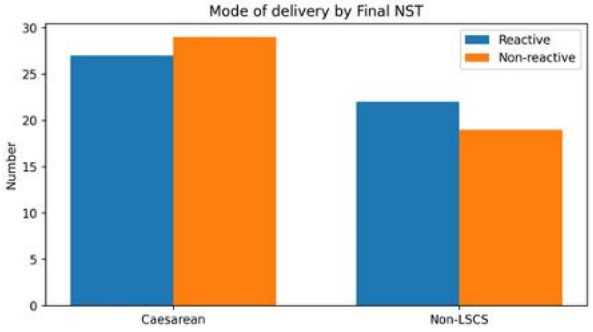

Figure 2. Mode of Delivery by Final Nst Reactivity.

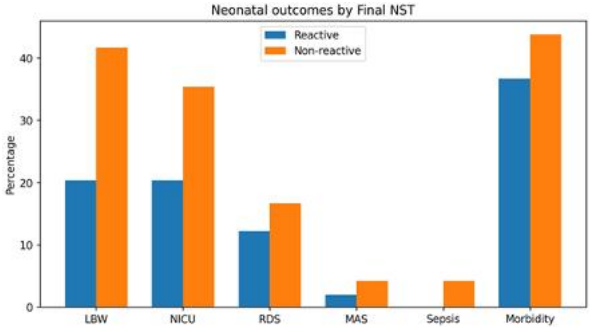

Figure 3. Selected Neonatal Outcomes by Final Nst Reactivity.

DISCUSSION

The principal finding was that Final NST reactivity was not significantly associated with Caesarean delivery. Although Caesarean delivery was numerically more frequent after a non-reactive Final NST, the difference was small and statistically non-significant. In a high-risk cohort, mode of delivery is influenced by previous LSCS, malpresentation, maternal disease, fetal condition and other obstetric indications. A non-reactive NST should therefore not be regarded as an isolated determinant of operative delivery.

ACOG guidance similarly emphasizes interpretation of surveillance findings within the overall clinical context.

LBW showed the clearest neonatal association. The proportion was approximately twice as high in the non-reactive group and the odds were 2.79-fold higher. This may be biologically plausible because placental dysfunction and fetal growth restriction can be associated with reduced fetal reserve and abnormal heart-rate responses. Never the less, the association cannot establish causation or independence because gestational age, fetal growth restriction and maternal disease may confound the relationship.

NICU admission, RDS, MAS, sepsis and discharge morbidity were numerically more frequent in the non-reactive group but were not statistically significant. The sample size was modest and several endpoints had very few events. NICU admission and respiratory morbidity are also strongly influenced by gestational age, birth weight and local admission practices.

The five neonatal deaths occurring exclusively in the non-reactive group represent an important clinical signal. However, only five deaths occurred and none occurred in the reactive group; consequently, a conventional odds ratio is unstable. The appropriate interpretation is that deaths were concentrated among non-reactive pregnancies in this cohort, not that non-reactive NST independently predicts neonatal mortality.

The heterogeneous risk profile is an important limitation. Previous LSCS, gestational diabetes, hypertensive disorders, Rh-negative pregnancy, thyroid disease, postdated pregnancy, anaemia and malpresentation were recorded, and individual pregnancies could have multiple risk factors. No multivariable adjustment was performed. Larger studies should incorporate gestational age, fetal growth, Doppler findings, maternal disease severity and indication for delivery.

Clinically, a non-reactive Final NST should prompt appropriate assessment rather than automatically being equated with fetal hypoxia or used alone as an indication for Caesarean delivery. Antenatal surveillance is a component of risk assessment rather than a standalone diagnostic endpoint.

STRENGTHS AND LIMITATIONS

Strengths included direct reconstruction from the 100-record master chart, explicit definition of the Final NST exposure, transparent handling of missing values, standardization of birth-weight units and exact testing for sparse categorical outcomes.

Limitations included the single-centre observational design, modest sample size, heterogeneous and overlapping high-risk conditions, absence of multivariable adjustment, variable source chart formatting, small numbers for uncommon outcomes, lack of a consistently recorded five-minute Apgar variable and absence of long-term neonatal follow-up.

CONCLUSION

In this 100-record high-risk cohort, Final NST was reactive in 49 pregnancies, non-reactive in 48 and missing in 3. Non-reactive Final NST was significantly associated with LBW but not with Caesarean delivery, NICU admission, RDS, MAS, neonatal sepsis or discharge morbidity. All five recorded neonatal deaths occurred in the non-reactive group, although the small number of events limits interpretation. Final NST should therefore be considered as one component of broader fetal surveillance, and larger prospective studies with standardized outcomes and multivariable adjustment are required.

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